

APPLICATION OF SOIL INFORMATION IN NIGERIAN AGRICULTURE: A CASE STUDY OF SOME HORTICULTURAL FARMS IN IBADAN, OYO STATE.

Okafor, B.N¹ and Fabiyi A. O².

¹ National Horticultural Research Institute, PMB 5432, Idi Ishin, Jericho, Ibadan.

²Agricultural Research Council of Nigeria ARCN, Mabushi, Abuja.

ABSTRACT

Soil information is a critical element in any agricultural venture. It often provides the missing link between assumptions and actuality in agricultural and non agricultural land use. A field study was carried out to assess the effects of poor application of soil information and the present level of soil information and utilization among small scale horticultural crop farmers in Ibadan, Oyo state. Six candidate citrus trees each were selected from two citrus orchards planted on suitable and marginally suitable soils based on available soil survey information which was monitored over two seasons, while structured questionnaires were administered to get empirical data on land use by the farmers. There was over 35% yield difference and this was significantly different ($P < 0.05$) with loss of some trees after 15 years of establishment of the orchard on marginally suitable soils. Mean yield per tree was 50.43kg and 30.12kg for suitable and marginally suitable plots respectively. None of the respondents sought professional advice on land use or have knowledge of previous land use type while the farms were not surveyed before use. 56.27% of the farmers do not carry out soil test while less than 10% of the farmers apply fertilizers suggesting nutrient mining with an average land use period of 14years. The findings of this work show that soil information is not adequately utilized among horticultural crop farmers in Oyo state. Therefore, there is need to enlighten farmers on the need for accurate soil information and application for enhanced horticultural crop production.

KEYWORDS: Soil information, horticultural crop production

INTRODUCTION

The performance of any horticultural venture depends to a very large extent on the amount of soil information that is available and applied by the farmers. Ogunkunle (1989) citing Babalola (1974) stated that soils in the same series can show difference in crop yield. Application of soil information is a necessity for horticultural crop performance as this helps to improve existing knowledge in the production area and invariably increase crop production if it is effectively utilized in managing crop production practices. Soil information developed through soil characterization, soil survey or soil test can be used for land use planning. (Okafor, 2008; Ashaye, 1987).

It has been observed that despite the relevance of soil information and scientific innovation to crop production, many horticultural farming enterprises are embarked on without initial knowledge of the properties of the soil. Furthermore, some farms where properties of the soil are known before use, many do not bother to update the information on soil properties in the management of land resources. Land evaluation, soil test and application of information generated on land capability and suitability for horticultural crop production is very important for farmers to get maximum production from their lands because crops are grown majorly on the soil which serves as an anchor for crops (Adigun, 2001., Seelig, 1993). Information on soils, its adoption and application in horticultural crop production affect areas such as land preparation, land use, use of fertilizers, herbicides, harvest, water use and other cultural practices. (Fadiji 2007;Aina, 1995) stated that information is a resource which must be adopted in order to make informed decision and those who possess it make more rational decision than those that do not have it. Adoption of scientific innovation is affected by issues such as availability of information on the issues at stake. In cases where information is available, it may not be reliable due to use of unscientific methods in generating information. Furthermore, where scientific information is available, it is not adequately adopted in horticultural crop production in Nigeria and in most part of sub Saharan Africa. (Aina and Adedigba, 1995). This is because many

horticultural crop producers do not see the need to seek information about the soils using scientific innovation in their various farming activities due to ignorance, lack of personnel or financial constraints. There is the need to manage the limitations of and also optimize the potentials of the soils to improve horticultural crop production as horticultural crop play a vital role in food security and national development. (Obiefuna and Lemchi; 2001).

This paper examined the level of application of soil information in horticultural crop production in Ibadan, Oyo state.

MATERIALS AND METHODS

The study was carried out on two citrus orchards in National Horticultural Research Institute, Ibadan, which lies on longitude $3^{\circ} 52'$ E and latitude $7^{\circ} 25'$ N. One orchard is located on a land which earlier soil survey recommended for use for tree crop production while the second orchard was established on soils recommended as unsuitable. Fruit yield data was collected over two years. Structured interview schedule was used to obtain information from horticultural farmers in Ibadan metropolis to determine their land use and land management patterns. Ibadan is in Oyo state, Nigeria and comprises 33 Local Government Areas with a land mass of 32,241sqkm, about 3.4% of Nigeria. It lies between latitude $7^{\circ} 02'$ and $7^{\circ} 10'$ North and longitude $2^{\circ} 04'$ and $4^{\circ} 30'$. The study area is in the Derived Savannah zone of Nigeria and has two weather seasons with an average annual rainfall of 1220mm. Temperatures varies between 22°C - 30°C depending on the season of the year. Nigeria. It enjoys two seasons with characteristic rainy and dry seasons occurring between April-October and November – February respectively.

Study population comprised horticultural farms in Oyo state.

Sampling method: Multipurpose and purposive sampling methods were used to select respondents for the study.

Measurement of variables: Variables measured include age of respondent, age of farm, level of education, sex, religion, years of experience, nature of business, number of employee, type of horticultural crop produced, land use and management.

Statistical analysis: The data obtained were analysed using mean and t -test.

RESULTS AND DISCUSSION:

Blanket application of fertilizers often leads to soil poisoning and in cases where there is no soil fertility rejuvenation; soil nutrient mining is often the order of the day. Most horticultural farmers in Ibadan do not apply fertilizers regularly (Table 1) but resort to using available soil moisture and nutrient. This often leads to poor yield and abandonment of such lands due to degradation. Furthermore, most of the farmers use the land without any knowledge of previous land use; this is also not encouraging as land use history shows the extent of fertilizer use and detection of soil microorganism which can constitute a problem to production. (Amador, 2009; Walker, 2009). A good soil survey helps to take informed decisions on land use (Loro, 2005, Dent and Young, 1981). Machanda *et al* (2002) stated that an intimate knowledge of the soil and their spatial distribution facilitates rational use of land for agriculture, forestry, irrigation and drainage.

Crop roots can be constrained by poor soil depth as caused by stony subsoil, presence of hard pans and other impermeable layers among others. The yield of citrus trees grown on soils with good soil depth, as recommended by soil survey information was significantly different from the yield of the orchard established on soils with poor soil depth, contrary to soil survey recommendations. (Table 2). Soil information utilization by horticultural farmers is low as most farmers did not survey their land or have any previous knowledge on the land they are using presently. Furthermore, fertilizer, herbicides and water are applied without soil test or experts advise as none of the respondents showed that such was or has been done on the land. (Olajide – Taiwo *et al.*, 2008) pointed out that poor soil management is one of the constraints to gardening. The finding of this work further confirmed that horticultural farmers in Ibadan rely on indigenous knowledge and already garnered experience in the areas of horticultural crop production only instead of generating scientific information on the soils used for crop production. Therefore, blanket application is used prominently in fertilizer application and has contributed greatly to soil degradation (Fagbami, 1993; Chang *et al*,1994).

According to the findings of this work, the average age of the farmers and period of land use is 40years and 14years respectively. This goes on to show that the youth are not involved in horticultural crops production. Most land used

for horticultural crop production are either acquired or on lease. Average farm size is 3.1metres showing that horticultural crop production in Ibadan is not exactly on large scale even among commercial farmers (Table 3). All respondents are involved in production and marketing of products, however 25% are involved in the processing of their products. This buttresses the work of Okumadewa (1993) which states that most of the agricultural produce in Nigeria wasted as a result of poor storage and processing of products. 56% of the respondents are into sole floriculture, while 6.25% are into fruit production solely. 37.75% are into combined production of fruits, vegetables and flowers. Others either combine floriculture with fruits production or floriculture with vegetables (Table 3). 6.25% of the respondents had tertiary education, 81.25% had secondary education while 6.25% had tertiary education (Table 3). The level of education is a major constraint to generation and adoption of soil information in horticultural crop production. Christians make up 81.25% of the respondents, while the remaining 18.75% are Muslims. Employee average per farm is 3.1m². Most farmers are male (87.50%) while women make up 12.50 %. (Table 3)

CONCLUSION.

In conclusion, most horticultural farmers in Oyo state do not make use of soil information in their production process either due to the high cost of generating such information, their unavailability and inaccessibility or due to ignorance which makes many not see a need for use of soil information in crop production. This trend needs to be reversed if food security must be attained.

REFERENCES

Adigun J.A. (2001). Influence of intra row spacing and chemical weeds control on the growth and yield of Chilli pepper. *Nigerian Journal Horticultural Science* 5: 67-73.

Aina L.O (1995): Information and agriculture in Nigeria. In: Aina L.O, Kaniki A.M, Ojiambo J.B. (Eds). *Agricultural Information in Nigeria*. Pp 1 – 11. Third World Information Services Ltd, Ibadan.

Aina L.O and Adedigba Y.A (1995). The development of agricultural information in Africa. In: Aina L.O, Kaniki A.M, Ojiambo J.B. (Eds). *Agricultural Information in Nigeria*. Pp 83 -103. Third World Information Services Ltd, Ibadan.

Ashaye, T.I (1987). Soil characterization and land use planning for rural development. In Babalola .O.(ed). *Proceedings of The 15th Annual Conference of Soil Science Society of Nigeria conference* . Pp 1-8.

Amador J.M. (2009). Fungal diseases and nematodes. Retrieved from <http://aggie-horticulture.tamu.edu/citrus>. Texas Agricultural Extension Service bulletin. Pp 1-4.

Chang .S, Huang .W., Lian .S., Chang .A. and Wu .W. (1994). Research on leaf diagnosis criteria and its application to fertilization recommendation for citrus orchards in Taiwan. *Food and Fertilizer Technology Center Extension Bulletin* 396. Pp 1 -17.

Dent .D. and Young .A. (1981). *Soil survey and land evaluation*. George and Allen publishers UK. Pp 1 -15.

Fadiji T.O (2007): Appropriateness of Information and Communication Technologies (ICTs) towards growth, rural and agricultural transformation in Nigeria. Pg 2-3. *16th Annual congress and General meeting of Nigerian Rural Sociological Association (NRSA)* held at Bowen University, Iwo, Osun State, Nigeria.13th-17th August, 2007.

Fagbami A.A. (1993). Soil as a factor of production. In; Aiyelari E.A, Lucas E.O, Abatan M.O and Akinboade O.A (Eds). *Fundamentals of Agriculture*. (pp 48 -53). Afrika -link books.

Loro. P. (2005). Detailed soil survey: The foundation of sustainable resource management. *Manitoba Agriculture, Food and Rural initiatives*. Retrieved from <http://gov.mb.ca>.

Okafor, B.N and Fabiyi A. O: Continental J. Agricultural Science 5 (2): 31 - 35, 2011

Manchanda M.L., Kudrat .M. and Tiwari A.K. (2002). Soil survey and mapping using remote sensing. *Tropical Ecology* 43(1): 61 -74

Obiefuna J.C and Lemchi J.I (2001): The role of horticulture in economic development. *Proceedings of the HORTSON conference*. Pp10-14.

Ogunkunle A.O (1989). Variation within taxonomic unit: The Ibadan series in South Western Nigeria. *Nigerian Journal of Soil science* 9: 9 -21

Olajide – Taiwo F.B, Adeoye I.B, Adebisi – Adelani .O., Odeleye O.M.O., Fabiyi A.O and Olajide – Taiwo L.O (2008). Assessment of benefits and constraints of home gardening in the neighbourhood of National Horticultural Research Institute, Ibadan, Oyo state. In: Sajo A.A, Futuless K.N, Neils J.S (eds). *Proceedings of the 26th annual conference of Horticultural Society of Nigeria, held October 26 – 30th, 2008 at Mubi, Adamawa state*. Pp 64 - 70

Okafor, B.N (2008). Soil survey Information: The foundation of sustainable horticultural crop production and management in Nigeria In: Sajo A.A, Futuless K.N, Neils J.S (Eds). *Proceedings of the 26th annual conference of Horticultural Society of Nigeria, held October 26 – 30th, 2008 at Mubi, Adamawa state*. pp 64 – 70.

Okumadewa .F. (1993).Agriculture in the development process of Nigeria. In; Aiyeleari E.A, Lucas E.O, Abatan M.O and Akinboade O.A (Eds). *Fundamentals of Agriculture*. (pp 78- 90) Afrika –link books.

Seelig .B. (1993): Soil Survey: The Foundation For Productive Natural Resources Management. *North Dakota State University Extension Bulletin 60*. Retrieved from <http://ag.ndsu.edu>.

Walker G.E. (2009). Nematodes and soil – borne fungi. Retrieved from <http://sardi.sa.gov.au/pestsdiseases>.

Table 1: Performance of citrus under different soil types

Season	Yield of 6 citrus trees(kg)
Performance of citrus under suitable soil.	302.56
Performance of citrus under marginally suitable soil.	191.67
T- test(0.05)	0.78

Table 2: Soil management patterns used by horticultural farmers in Ibadan, metropolis

Soil management option	Percentage of respondents
Fertilizer application	56.25
Irrigation	43.75
Soil test before fertilizer application	Nil
Use of soil information	Nil
Previous knowledge of farm history	Nil
Application of soil survey information in land use.	Nil

Table 3: Percentage distribution of respondents according to their personal characteristics

Personal Characteristics	Categories	Percentage
Age(years)	>40	87.50
	<40	12.50
Sex	Male	87.50
	Female	12.50
Farmers participation in:	Production	100
	Processing	25
	Marketing	93.75
Horticultural crop produced	Vegetable	56
	Floriculture	6.25
	Fruits	37.75
Education	Primary	6.50
	Secondary	87.00
	Tertiary	6.50
Religion	Christian	81.25
	Muslim	18.75
Farm size(m ²)		
Age of farm (years).	1-10	38.00
	10-20	43.75
	20-30	18.25
Farm employee (persons)	1 -2	62.50
	2-3	0
	3-4	12.50
	4-5	25.00

Source: Field survey, 2008.

Received for Publication: 14/08/2011

Accepted for Publication: 12/10/2011

Corresponding author

Okafor, B.N

National Horticultural Research Institute, PMB 5432, Idi Ishin, Jericho, Ibadan.

E-mail: kpakpando2009@gmail.com